

## **REMARKS/ARGUMENTS**

### **A. Summary of the Amendment**

Reexamination and reconsideration are courteously requested. By way of this paper, claims 1, 31, and 34 are amended, and no claims are added, or canceled. Thus, claims 1 to 6, 10, 12 to 13, 16, 30 to 31, 34 to 41, and 43 remain pending for the Examiner's consideration, with claims 1, 10, 16, 30, 31, and 41 being independent claims.

### **B. Allowable Subject Matter**

Claims 10, 12 to 13, 16, and 30 are indicated as being allowed. Applicants thank the Examiner for a thorough consideration of these claims.

### **C. Claim Objections**

Claims 1 and 34 are objected to as allegedly reciting the features in a confusing manner. Applicants agree with the Examiner's suggestion to change the word "on" to "over" and the present amendment complies with this suggestion.

### **D. Rejections Under 35 U.S.C. § 103(a)**

Independent claim 31 is rejected as being unpatentable over U.S. Patent No. 6,444,259 (Subramanian). This rejection is respectfully traversed. The claim is directed to a method for depositing a coating of modified MCrAlY alloy onto a superalloy substrate in multiple layers, wherein a first layer of Pt-including modified MCrAlY alloy is deposited onto the superalloy substrate, and a second layer of modified MCrAlY alloy is deposited on top of the first layer, wherein the second layer does not include Pt.

In contrast, Subramanian discloses (col. 5, lines 5 to 20) a first bond layer that includes at least two layers. The lower layer(s) (60) include(s) a mixture of MCrAlYX and particles of Pt or Pt alloys, and the upper layer(s) (62) include(s) an unmodified MCrAlY. An important distinction lies in the fact that the Pt or Pt alloys do not alloy with the MCrAlY metal to form a modified MCrAlYX alloy, but remain as intermixed particles that function as independent components to function as diffusion blockers. Furthermore, there is no teaching or suggestion of any subsequent process that would cause the Pt particles to alloy with the MCrAlY metal. In fact, Subramanian teaches away from any subsequent thermal processes that might cause alloying to occur (see col. 6, lines 45 to 56). Because Subramanian fails to disclose a method in which a first layer of Pt-including modified MCrAlY alloy is deposited onto a superalloy substrate, each and every element of claim 31 is neither taught nor suggested by Subramanian and the rejection of claim 31 should be withdrawn.

Furthermore, the second layer (62) disclosed by Subramanian is not a modified MCrAlY alloy (also conventionally defined as MCrAlYX, and further defined in the same manner in paragraphs 0051 and 0052 of the specification) as recited in claim 31. Because Subramanian fails to teach or suggest "a second layer of modified MCrAlY" as recited in claim 31, the rejection under 35 U.S.C. § 103(a) should be withdrawn.

Claim 31 is also rejected as being unpatentable over Subramanian in view of U.S. Patent No. 5,232,259 (Platz). These rejections are respectfully traversed. To start, Platz fails to compensate for the deficient teachings of Subramanian regarding the failure by that reference to teach or suggest a method in which a first layer of Pt-including modified MCrAlY alloy is deposited onto a superalloy substrate. Platz is merely cited for disclosing (col. 1, lines 31 to 42) that a modified MCrAlY alloy is a conventional substrate coating, but makes no reference to inclusion of Pt in such a coating. For at least this reason, the rejection of claim 31 should be withdrawn.

Claims 1 to 6, 34 to 36, 38 to 40, and 43 are rejected as being unpatentable over U.S. Patent No. 6,475,642 (Zhao) in view of Submaranian and Platz. The rejections are respectfully traversed.

Independent claims 1 and 34 are directed to an MCrAlYX alloy coating, and to a turbine blade having such a coating. The coating includes a first coating layer formed on the substrate and comprising an alloy having a composition represented by the formula MCrAlYX, wherein M comprises at least one member of the group consisting of Ni, Co, and Fe, and X comprises Pt and at least one member of the group consisting of Hf, Si, Zr, Ta, Re, and Ru, the weight percentage of X to the total alloy composition being within the range of about 0.1% to about 28.0. The coating further includes at least one additional coating layer on either side of the first coating layer, wherein the at least one additional coating layer includes an alloy having a composition represented by the formula MCrAlYX (modified MCrAlY) that does not include Pt. Please refer, for example, to paragraph 0051 of the present application for a description of this embodiment.

In contrast, Zhao discloses coatings for turbine blades that may include MCrAlYX, but does not include any type of multiple layered MCrAlYX coating as recited in the independent claims. Consequently, Zhao fails to disclose a multiple layered modified MCrAlY coating (MCrAlYX) wherein one MCrAlYX layer includes Pt and another MCrAlYX layer does not include Pt.

Subramanian and Platz fail to compensate for the deficient teachings of Zhao. While Subramanian discloses (col. 5, lines 5 to 20) a first bond layer (60) that includes MCrAlYX mixed with particles of other metals such as Pt, and a second bond layer of MCrAlY (62), the first bond layer (60) does not have Pt included in the MCrAlY alloy, as discussed previously. Platz is merely cited for disclosing (col. 1, lines 31 to 42) that a modified MCrAlY alloy is a conventional substrate coating, but makes no reference to inclusion of Pt in such a coating.

Furthermore, none of the references teaches or suggests that a second layer, formed on a side of the Pt-including MCrAlYX alloy, is a Pt-free MCrAlYX alloy. The second bond layer (62) disclosed by Subramanian is not a modified MCrAlY as recited in claims 1 and 34. The modified MCrAlYX disclosed by Zhao is not part of a multi-layered structure, and there is no motivation in any of the cited references to substitute the modified MCrAlYX layer of Zhao with the unmodified MCrAlY layer (62) of Subramanian. Because the cited prior art fails to

teach or suggest "a second layer of modified MCrAlY" as recited in claim 31, the rejections based on Zhao, Subramanian, and Platz should be withdrawn.

Independent claim 41 is rejected as being unpatentable over Zhao in view of Subramanian and U.S. Patent No. 6,264,039 (Chyi). This rejection is respectfully traversed.

Claim 41 is directed to a powder composition represented by the formula MCrAlYX, wherein M comprises at least one member of the group consisting of Ni, Co, and Fe, X comprises a combination of at least Pt, Re, Ru, Hf and Si, and the weight percentage of X to the total composition is within the range of about 0.1% to about 28.0%. In contrast, Zhao discloses various alloys, some of which are modified MCrAlY materials. However, the only materials disclosed by Zhao that include rhenium are listed in the Table in column 9, and none of those rhenium-including alloys are MCrAlY alloys.

The Examiner asserts that Zhao discloses (col. 4, lines 10-12, 23-24) that "precious metals" are included in the alloys, and cites Chyi for teaching that rhenium may be considered a precious metal that is useful for high temperature oxidation resistance applications. However, it is respectfully pointed out that even in view of this teaching, claim 41 is not directed to an alloy, *but to a powder composition*. Even if Zhao in view of Chyi suggests a modified MCrAlY alloy that includes rhenium, nowhere in Zhao is there a teaching or suggestion of a powder composition that includes the elements recited in claim 41 in a single powder composition. Zhao discloses numerous methods for forming the alloy including induction melting, spraying, and deposition processes. However, it is well known that in such processes the elements are often added incrementally, or are at least partially pre-alloyed and melted or powderized with some or all of the elemental components prior to forming a layer of the alloy. Nowhere in Zhao (or Chyi) is there a teaching or suggestion of all of the elements recited in claim 41 in elemental form and in a *single* powder composition. For at least this reason, the rejection of claim 41 should be withdrawn.

In view of Applicant's amendments and remarks, it is respectfully submitted that Examiner's objections and rejections have been overcome. Accordingly, Applicants respectfully submit that the application is now in condition for allowance, and such allowance is therefore earnestly requested. Should the Examiner have any questions or wish to further

discuss this application, Applicants request that the Examiner contact the Applicants attorneys at the below-listed telephone number. If for some reason Applicants have not requested a sufficient extension and/or have not paid a sufficient fee for this response and/or for the extension necessary to prevent abandonment on this application, please consider this as a request for an extension for the required time period and/or authorization to charge Deposit Account No. 50-2091 for any fee which may be due.

Respectfully submitted,

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